STRATEGIC PLAN

For the

COMMONWEALTH GRADUATE ENGINEERING PROGRAM

By

Dr. James F. Groves, UVA CGEP Director
University of Virginia

Dr. Glenda Scales, CGEP State Director and VT CGEP Director
Virginia Tech

May 2002

LETTER FROM THE DEANS

Our institutions, George Mason University, Old Dominion University, University of Virginia, Virginia Commonwealth University and Virginia Tech, constitute the Commonwealth Graduate Engineering Program (CGEP), and we stand committed to providing the engineers and scientists in Virginia's knowledge-based high technology companies with the best possible educational opportunities. We began collaborating in the early 1980's to offer degree programs using distance-learning technology so that engineers could be assured of an opportunity to earn advanced degrees close to home. This collaborative effort, the CGEP, has served engineers in a variety of disciplines over the past seventeen years. We believe that this professional learning experience is indispensable for continued innovation and economic development in the Commonwealth.

Lloyd Griffiths
Dean, School of Information Technology & Engineering
George Mason University

Malcolm J. McPherson
Interim Dean, College of Engineering
Virginia Polytechnic Institute and State University

R J Mattauch
Dean, School of Engineering
Virginia Commonwealth University

William Swart
Dean, College of Engineering and Technology
Old Dominion University

Richard W. Miksad
Dean, School of Engineering and Applied Science
University of Virginia

Strategic Plan Team

James F. Groves
UVA CGEP Director
University of Virginia

John H. Payne III
Cp-Ed Technologies
University of Virginia

Rita F. Kostoff
UVA CGEP Administrator
University of Virginia

Glenda R. Scales
State CGEP Director and VT CGEP Director
Assistant Dean for Distance Learning and Computing
Virginia Tech

Cheryl A. Peed
Coordinator for Instructional and Research Services
Virginia Tech

EXECUTIVE SUMMARY

Since its establishment in 1983, the Commonwealth Graduate Engineering Program (CGEP) has provided engineers in Virginia and throughout the country with opportunities to earn advanced degrees at a distance. CGEP's course offerings have attracted many students, leading to the development of a more competitive Commonwealth. Today, the value of advanced technical education is undiminished. Indeed it has grown dramatically. Economic competitiveness depends upon industrial success in advanced fields such as information technology, transportation, energy production, biotechnology, microelectronics, and nanotechnology. For the workforce and industries of Virginia to be competitive, they must have timely access to the highly technical knowledge being generated in these fields throughout the world. This need represents both an opportunity and a challenge for CGEP. The world-class faculty at the five CGEP member institutions (George Mason University, Old Dominion University, University of Virginia, Virginia Commonwealth University, and Virginia Tech) are well positioned to gather, interpret, and often create the new knowledge driving forward engineering and science today. As CGEP looks forward at the next five years, it must be certain that it is equally well positioned to assist in the transfer of that new knowledge from Virginia's faculty to its high technology workforce so that the Commonwealth's companies can compete and win in the knowledge-based economy of the twenty-first century, to the benefit of all society.

This strategic plan outlines CGEP's vision for distance delivery of post baccalaureate engineering and science education during the next five years. Specifically this plan explains how CGEP intends to move its product (faculty knowledge of high technology) to market (high technology, corporate-based engineers and scientists). This plan shows how CGEP intends to develop desired courses by motivating faculty and universities. This plan explains how CGEP intends to reliably deliver its courseware products to market using high-quality, low-cost delivery methods. Finally, this strategic plan describes a marketing strategy that will increase demand for CGEP's courseware products through effective advertising, attention to student satisfaction, and the creation of more, convenient outlets for access to CGEP curricula.

The goals for CGEP during the next five years are summarized in the following points:

1. **Product Development: Increase the Diversity of CGEP Curricula**
   The 2001 CGEP Market Research Study revealed several important educational trends that must be addressed during the next five years. First, although many students want to earn degrees, many others have different educational goals. These goals include certificate-level education in a specific competency or acquisition of "Bits of Knowledge" that allow individuals to learn specific skills immediately applicable at work. CGEP will work to develop this type of content while ensuring that faculty are properly recognized for their delivery of these high-demand educational materials.

   Second, in the survey, employers in Virginia's high technology companies identified leadership, project management, software, and information technology as preferred course topics that can enhance workforce effectiveness. In addition to delivery of core degree program courses, CGEP will work to meet this demand for a well-balanced selection of engineering, information technology, and leadership and management courses.

   Third, CGEP will seek to anticipate future market demand for course materials by identifying knowledge-based, high technology fields growing in importance and beginning to plan for relevant curricula. The program will pilot select course offerings in emerging fields as part of an overall effort to continuously improve and add to CGEP's curricula. This proactive

approach will give faculty time to develop degree, certificate, and non-credit offerings that convey knowledge effectively in a distance-learning environment. As university faculty transition fundamental research into applied projects in emerging fields such as biotechnology and nanotechnology, there will be increased market demand for knowledge in these areas. Companies will want to position themselves to take advantage of innovations in these fields, and CGEP must anticipate those desires through targeted course development. Where possible, CGEP will develop these new course offerings by collaborating with other groups in the state that have an interest in educational materials development and by engaging a new CGEP corporate advisory board. In certain instances CGEP may join with one or more of these Virginia-based activities to pursue outside funding for development of new, innovative educational materials, above and beyond the CGEP portfolio that can be supported through General Assembly allocations.

2. **Product Development: Raise the Incentives for Development and Delivery of CGEP Curricula**
   The 2001 CGEP Market Research Study reminds the program that distance learning is a consumer driven enterprise. CGEP's customers - its students and their employers - are drawn to a program that is perceived to provide insight into high technology opportunities. To ensure that CGEP offers courses which afford its customers opportunities in the global economy, the developers of CGEP courses, i.e. the faculty, departments, and schools within CGEP that can deliver course content, must be given incentives to develop courses in the important disciplines. By working with the CGEP member institutions to increase faculty incentives for course development, CGEP will accelerate the timely, high quality delivery of desirable knowledge to Virginia's workforce, fuel an educational engine that routinely produces the finest educational content possible for Virginia's industrial workforce, and drive the Commonwealth toward greater economic prosperity.

3. **Product Distribution: Enhance the Technology Infrastructure**
   Since the program's inception, CGEP has worked to utilize effective media for the transmission of its courses. At present, the consortium employs two-way interactive video, the choice of 80% of the public four-year institutions around the country. CGEP will enhance course delivery by identifying more effective ways to utilize the staff and infrastructure available for course development and transmission, without sacrificing quality of service. As changes are made to transition to distance learning solutions such as web based course delivery, students must continue to feel a sense of community, project involvement, access to faculty, and access to other individuals participating in each course offering. CGEP will involve itself in discussions of future course delivery technologies and work closely with administrators at the five CGEP member universities to minimize differences in electronic course delivery experienced by students taking courses from multiple CGEP institutions.

4. **Product Distribution: Develop Just-in-Time Delivery Opportunities**
   Within today's fast-paced high technology world, it is often difficult for employees to consistently carve out set times each week to pursue their advanced education goals. As a result, the demand for asynchronous learning is on the rise, and CGEP must evaluate how best to meet this market need while maintaining course quality. While there is a demand for asynchronous learning via the internet, students indicate repeatedly that they want to be part of a learning community. CGEP must balance the market demand for just-in-time access to course content with the recognized benefits of learning in an educational community. CGEP

will identify education opportunities where asynchronous or blended learning (i.e. asynchronous mixed with synchronous delivery) can enhance the effectiveness of the program's learning environment.

5. **Product Sale: Expand Product Advertising**
   The 2001 CGEP Market Research Study reported that CGEP should establish a brand name for its educational offerings to enhance program visibility. Within this strategic plan it is suggested that CGEP begin to use its centralized web site to market courses more effectively. As this web site is brought on-line, CGEP will consider new brand names for its course offerings, e.g. *The Virginia Leading EDGES Program*. A program title like this and an associated logo could enhance market recognition of CGEP's mission to offer Education at a Distance in Graduate Engineering and Science (EDGES). Additionally, CGEP should explore opportunities to leverage the efforts of other state or federally sponsored education programs in Virginia. Through collegial cooperation, CGEP and other education initiatives such as the Virginia Consortium of Engineering and Science Universities (VCES) or the soon to be formed NASA National Institute of Aerospace (NIA) could effectively and collaboratively serve the various segments of the engineering and science education market. Finally, CGEP will investigate how to enhance the satisfaction of its current student base. Working with its industrial advisory board, CGEP will monitor student feedback closely and seek to make program adjustments when appropriate. CGEP recognizes that satisfied students will tell colleagues of the program, leading to opportunities for enhanced CGEP enrollment in future years.

6. **Product Sale: Create More Outlets**
   As CGEP creates a more varied, timely, and well-publicized set of educational offerings, product demand should increase. Enrollment within the program should then be enhanced through installation of more outlets for course distribution. Working closely with individual companies, CGEP will seek to establish course delivery platforms inside the doors of high technology companies. On-site delivery of course content to students will increase program flexibility for students and begin to harness the economy of scale that comes from course delivery to large numbers of students. Efforts to create more CGEP outlets will be linked closely with CGEP's ongoing study of distance learning technology developments (Point 4 above).

In summary, the professional development needs of engineers in Virginia's high technology companies now cover a broad spectrum of disciplines, including technical engineering content, information technology content, and content on leadership and management. Faculty must have the incentives necessary to develop educational materials for this new environment. CGEP must then offer a flexible, reliable, and effective means of course delivery to the largest audience possible. Through implementation of this five-year strategic plan, CGEP will generate increased enrollments in *The Virginia Leading EDGES Program* and significantly enhance the ability of Virginia corporations to compete and win in today's knowledge-based, high technology international markets, to the benefit of all society.

Table of Contents

Letter from the Deans……..……....ii

Strategic Plan Team…….…….iii

Executive Summary…….…..……iv

Table of Contents…….....vii

Vision Statement……..……..……... 1

Mission Statement……..……1

Core Values……1

Introduction to a Strategic Plan…….… 2

History of the Commonwealth Graduate Engineering Program…….……...3

Stakeholders.…….……..……..……5

State Director's Statement: Thoughts for the Future ……...……..……... 6

Program Goals for 2007...…...……...7
Product Development
Increase the Diversity of CGEP Curricula…….…….…...7
Recognize the Development and Delivery of CGEP Curricula……...10
Product Distribution
Enhance the Technology Infrastructure……...…….……...…...…… 11
Provide Just-in-Time Delivery...……..……12
Product Sale
Expand Product Marketing……...……...…… 14
Create More Outlets…….……16

Concluding Thoughts……..……..…17

Acknowledgements……..…18

VISION STATEMENT

The Commonwealth Graduate Engineering Program promotes economic development and social well being through delivery of advanced engineering and science post baccalaureate educational opportunities to the citizens of Virginia. It provides a geographically dispersed community of engineers and scientists with the knowledge tools necessary to craft economic success in markets driven by advanced engineering and science. By joining world-class faculty, an internationally recognized corporate base, and a community of dynamic and diverse students, this program distributes knowledge of high technology for the benefit of the Commonwealth of Virginia.

MISSION STATEMENT

The Commonwealth Graduate Engineering Program's core mission is to serve as the Virginia distance-learning provider of post-baccalaureate education for practicing engineers and scientists who want to maintain and enhance their skills. CGEP works closely with faculty at a set of member institutions to encourage the development of educational materials relevant to working scientists and engineers in Virginia. Using state-of-the-art distance learning technology and a network of content receiving institutions, CGEP delivers course content to Virginia's workforce. As a result, CGEP contributes to the economic development and social well being of Virginia through workforce training and life-long learning.

CORE VALUES

The Commonwealth Graduate Engineering Program seeks to:

1. Provide high technology, knowledge-based economy workforce and economic development opportunities for the Commonwealth.
2. Respond to the post-baccalaureate high technology needs of Virginia through timely delivery of a diverse set of educational course materials to the community.
3. Provide students with high quality, academically rigorous opportunities to benefit from the graduate engineering curriculum of Virginia's most recognized universities through cooperation and collaboration.
4. Offer post-baccalaureate engineers and scientists the opportunity to pursue master's degrees in engineering.
5. Utilize faculty resident at a set of member institutions to teach CGEP degree courses.
6. Allow course offerings to be obtained using state-of-the-art distance learning technology with no residency requirement at any host institution.
7. Organize offerings so that master's degrees can be completed within five years or less.
8. Provide knowledge workers employed by corporate Virginia with the same high quality instruction available on-site at Virginia's major research universities.
9. Deliver excellence in engineering instruction.
10. Offer program flexibility by allowing credits earned at any of the participating institutions to be counted towards a master's degree with 50% or more of the course content coming from the degree granting institution.

INTRODUCTION TO A STRATEGIC PLAN

Since its inception in 1983, the Commonwealth Graduate Engineering Program (CGEP) has provided engineers in Virginia and throughout the country with opportunities to earn advanced degrees at a distance. CGEP's course offerings have attracted many students, leading to the development of a more effective high technology workforce and enhanced economic competitiveness for Virginia-based industries. Today, the value of advanced technical education in a knowledge-based economy is undiminished. Indeed it has grown dramatically. In twenty-first century Virginia, economic competitiveness depends upon industrial success in advanced engineering and science fields such as information technology, transportation, energy production, biotechnology, microelectronics, nanotechnology, and defense. Competitiveness in these arenas depends upon rapid assimilation of worldwide developments. The link between knowledge of high technology and graduate education was noted by John Hager during his tenure as Virginia's Lieutenant Governor, "Virginia cannot be second best in the 21st century; rather, we must strive for preeminence as a Commonwealth. Our institutions of higher learning will be the vehicle, partnering with state government and generating the spark through graduate education, to carry us forward with economic and social prosperity."

For the workforce and industries of Virginia to be competitive, they must have timely access to the very technical knowledge generated throughout the world in the myriad of high technology fields that produce economic opportunity. This need represents both an opportunity and a challenge for the Commonwealth Graduate Engineering Program. The world-class faculty at the five CGEP member institutions (George Mason University, Old Dominion University, University of Virginia, Virginia Commonwealth University, and Virginia Tech) are well-positioned to gather, interpret, and often create the new knowledge driving forward engineering and science today. As CGEP looks forward at the next five years, it must be certain that it is equally adept at facilitating the transfer of that new knowledge from Virginia's top faculty to its industrial workforce so that the Commonwealth's companies can compete and win in the high technology economy of the twenty-first century, to the benefit of all society. CGEP has a vital role to play in Virginia as the ongoing link between higher education and the Commonwealth's knowledge-based high technology companies. As Ernest Smerdon noted in his April 2000 report to the State Council of Higher Education for Virginia (SCHEV), "If CGEP did not exist, the leadership of the state would quite likely be looking at ways to create it.[1]"

Given the vital role of CGEP within Virginia, this document outlines future priorities and directions for the Commonwealth Graduate Engineering Program (CGEP). In combination with a self-study outline developed in August 1999 and a market research study completed in June 2001, this strategic plan responds to SCHEV's request in July 1999 that CGEP undertake a broad-ranging self-study. This strategic plan represents a significant step toward that end. It is the result of a series of working documents and discussions in recent months among CGEP directors and others about the program's strengths, challenges, and opportunities.

This strategic plan outlines CGEP's vision for distance delivery of graduate engineering and science education during the next five years. Specifically this plan explains how CGEP intends to move its product (faculty knowledge of cutting-edge high technology fields) to market (high technology, corporate-based engineers and scientists desiring advanced education). This plan

[1] Report to the Commonwealth of Virginia State Council of Higher Education for Virginia (SCHEV) on a review of the Commonwealth Graduate Engineering Program (CGEP), Ernest T. Smerdon, Engineering Education Consultant, Tuscon, AZ, April 2000.

shows how CGEP intends to develop sufficient quantities of desired high quality course offerings by ensuring that the faculty and schools capable of producing such courseware products have the proper incentives to do so. This plan then explains how CGEP intends to reliably deliver its courseware products to market using standardized, low-cost, and when possible just-in-time delivery methods. Finally, this strategic plan describes a marketing strategy that is designed to increase demand for CGEP's courseware products through an effective advertising plan and the creation of more, convenient outlets for access to CGEP curricula.

HISTORY OF THE COMMONWEALTH GRADUATE ENGINEERING PROGRAM

The Commonwealth Graduate Engineering Program (CGEP) is the leading distance learning provider of graduate engineering courses and degree programs to the high technology, knowledge-based workforce of Virginia. Since 1983, this consortium, consisting of five universities, has collaborated to provide graduate engineering courses and master's degree programs to working engineers and other qualified individuals with strong backgrounds in science.

Virginia Tech, the University of Virginia, and Virginia Commonwealth University were the initial universities to establish CGEP during the fall of 1983. Old Dominion University and George Mason University joined at a later date. Subsequently, each university received state appropriations allotted by the General Assembly and administered by the State Council of Higher Education for Virginia (SCHEV) to support the operation of CGEP. After growth of state support in the early years of the program, these appropriations have remained constant since the 1992-94 biennium (SCHEV meeting, June 2000).

During the early development of CGEP, positions were established at each of the five member institutions to guide program development. These local CGEP directors took the lead in developing the program, creating an integrated program structure which included the understanding that each university would offer unique graduate degree programs rather than duplicate the offerings of other universities within the consortium. Additionally, the CGEP directors worked together to ensure that each university was given the responsibility of providing a regional presence for the promotion of the overall CGEP activity.

Through the consortium, students are able to pursue degrees in several disciplines: aerospace engineering, biomedical engineering, chemical engineering, civil engineering, computer science and engineering, electrical engineering, engineering management, materials science and engineering, mechanical engineering, modeling and simulation, and industrial and systems engineering. Students have a special opportunity to join an extended campus learning community close to their work or home, participating with students taking their course at other distance learning sites and on the various CGEP campuses.

The distance learning delivery systems have progressed since 1983 when the primary delivery mode was a land-based microwave system. The next stage was to move to a truly state-wide system by which satellite television was used to send classes to receive sites. Due to the high cost of satellite television, a transition was made in 1998 to Net.Work.Virginia, an asynchronous transfer mode (ATM) wide area network. This transition provided the consortium with the flexibility to have connectivity to the network at all times. The costing model of a flat rate fee schedule coupled with the ability to originate programming from all CGEP universities greatly expanded the program's ability to grow without incurring additional delivery costs.

Today CGEP has a number of receive sites located within private companies, the federal government, community colleges, and higher education centers. Additional receive sites can be added to accommodate corporations that have the appropriate equipment. For students unable to attend a given class session, CGEP provides the means for review of class sessions using videotape or streaming video. As the program looks toward its future and innovative ways to scale the delivery of courses, it appears that the increasingly stable internet offers strong possibilities for program growth. The commercial market has already begun to develop tools that allow faculty to create internet-based online learning communities, and, it appears that these tools will be accepted by the faculty when coupled with adequate training and support.

Since 1983, CGEP has grown and changed to meet the needs of its faculty, corporate, and student community. This organization has a solid infrastructure with excellent faculty and quality programs to support the distribution of knowledge across the Commonwealth. Through CGEP, Virginia is well positioned to compete and deliver quality graduate engineering programs. As Ernest Smerdon noted in his April 2000 report to SCHEV, “CGEP has the solid framework upon which to build the programs needed for the early years of this new century. It would be a mistake to cease or downsize the operation. To do so would send the wrong signals to Virginia’s working engineers, the corporate leaders, and the committed faculty of the CGEP universities.”

The last CGEP strategic plan was prepared in 1996. It contained useful background information and data about CGEP enrollments, costs, shifting technology platforms, and program "competition.” This 2002 strategic plan will use similar information, as contained in the 2001 CGEP Market Research Study, to lay out a concise, coherent, and usable roadmap for CGEP's steps into the twenty-first century. To perform its mission over the next five years, CGEP will now introduce its strategic business plan, focusing upon the three key aspects of its activity – product development, delivery, and sale. Faculty must have the incentives necessary to develop educational materials for CGEP. The program must then offer a flexible, reliable, and effective means of course delivery to the largest audience possible.

STAKEHOLDERS

The Commonwealth of Virginia

State Council of Higher Education for Virginia (SCHEV):

Carl N. Kelly (Chairman)
Whitney Adams
Daniel T. Balfour
Rayford L. Harris
Karen F. Marcus
Delceno C. Miles
Robin Miner
John D. Padgett
Molly Shepherd
David G. Shuford
Cheri P. Yecke

CGEP Consortium Deans:

Lloyd Griffiths
Dean, School of Information Technology & Engineering
George Mason University

William Swart
Dean, College of Engineering and Technology
Old Dominion University

Richard W. Miksad
Dean, School of Engineering and Applied Science
University of Virginia

Robert J Mattauch
Dean, School of Engineering
Virginia Commonwealth University

Malcolm McPherson
Interim Dean, College of Engineering
Virginia Tech

Statewide Chair of CGEP:

Glenda Scales, Virginia Tech

CGEP Directors:

Stephen Nash, George Mason University
Gerald Miller, Virginia Commonwealth University
James Groves, University of Virginia
Glenda Scales, Virginia Tech
Berndt Bohm, Old Dominion University

STATE DIRECTOR'S STATEMENT: THOUGHTS FOR THE FUTURE

Over the past two years the Commonwealth Graduate Engineering Program directors worked closely with our stakeholders to critically rethink how CGEP will provide world-class post baccalaureate educational experiences to practicing engineers and scientists. This task provided the strategic planning team a rare chance to review the history of CGEP, identify our unique opportunities, list our challenges, and most importantly develop a thoughtful plan designed to ensure our continued success in providing the highest quality distance learning experiences for the citizens of Virginia. These conversations coupled with the research provided in the 2001 market study of CGEP point toward an exciting and changing landscape for the distance education market.

Our team recognized that CGEP has a historical presence and successful track record in the Commonwealth for providing educational experiences to the Commonwealth's engineers and scientists. Attributes of this current structure, such as the promotion of unique programs, the delivery of courses from on-campus degree programs, the flexibility of transferring course credit among the CGEP universities, and the in person services provided to students at receive sites are key aspects that form the foundation of CGEP. Furthermore, the convergence of information technologies in voice, video and data open countless opportunities for CGEP. For example, student reception of desktop delivered distance learning courses via the Internet is becoming more common and as a result many of our students have the expectation to receive courses of this nature. Our goal is to be proactive in ensuring that programs take advantage of state-of-the-art technology as well as provide our learners with educational experiences that are challenging and stimulating.

As we build upon this foundation for the future our challenge will be to meet the needs of our 21st century learner. These learning experiences can take the form of "Bits of Knowledge" learning modules, graduate credit or non-credit course offerings. The key is for CGEP to be agile enough to provide flexible and convenient learning opportunities that meet the needs of our customers. In this effort we are deeply committed to moving CGEP forward in the distance education market. Together we have the requisite intellectual property, technologies, and skills to create exceptional opportunities that will continue to make a difference.

Glenda Scales
State CGEP Director and Virginia Tech CGEP Director
Assistant Dean for Distance Learning and Computing

PROGRAM GOALS FOR 2007

During the last two years, CGEP has initiated several projects that have helped to generate an assessment of the program and its activities. In April of 2000 it commissioned a review of its activities by Ernest T. Smerdon, an engineering education consultant and former dean of engineering at the University of Arizona[2]. In 2001 CGEP conducted a Market Research Study[3], looking at employers, potential markets, students, faculty, and other consortia arrangements across the country. Based on the insight gained from these reports, the program is now in a position to develop a five year strategic plan based upon an understanding of the current distance learning environment. By reaching Goals 1 - 6 outlined below, CGEP will achieve its overall programmatic objective - contributing to the economic development and social well-being of Virginia through delivery of high technology educational materials and development of life-long learning opportunities for the Commonwealth's knowledge workers.

1. **Product Development: Increase the Diversity of CGEP Curricula**

   The 2001 CGEP Market Research Study revealed several important educational trends that must be addressed during the next five years. Although many students want to earn degrees, many others have different educational goals. These goals include access to a) certificate-level education in a specific competency, b) non-credit continuing education, and c) "Bits of Knowledge" that allow individuals to learn specific skills immediately applicable at work. CGEP must decide how extensively to address this feedback.

   Eighty-one per cent of potential CGEP students (n=601) surveyed in the market study said they would be most interested in taking non-credit or training courses, compared with 66% who were interested in certificate courses and 55% who were interested in credit/degree courses. Further, when those potential students were asked what factors were "very important" to their professional success, just 32% said a graduate degree and 30% said "able to certify knowledge in my area (through certificates)."

   While the market survey suggests that CGEP should significantly change the educational products that it sends to market, Smerdon's report cautions against too extensive or rapid a move to respond solely to market pressures, "While some universities are increasing the offerings in non-credit courses, I do not suggest that CGEP shift its focus."

   The CGEP curriculum has historically been supply-side driven, with the CGEP partners offering master's degree courses from their traditional academic portfolio. In the future, if CGEP is to be perceived as responsive to its customers, it must add demand-driven curricula. This will require development and delivery of new courses and educational formats at the same time that the program retains its core strength of master's degree offerings.

   In addition to uncovering a strong desire for non-degree course offerings, the 2001 CGEP Market Research Study reports that Virginia's high technology, corporate-based engineers and scientists wish to have access to a greater diversity of subject offerings, particularly leadership and project management or software and information technology courses. While 32% of the surveyed students expressed a strong desire to obtain graduate engineering degrees, 55% expressed desires for more leadership and management knowledge and 63% reported interest in additional information-technology knowledge.

---

[2] Smerdon report as referenced in footnote 1.

[3] Market Research Study Commonwealth Graduate Engineering Program, College of Engineering, University Outreach, Virginia Polytechnic Institute and State University, June 2001.

Finally, in the market research survey of current and recent CGEP students, more than a quarter of the respondents expressed a desire to see increased course selections, far more than any other specific recommendation for changes to CGEP. CGEP believes that many of these new course offerings should be in developing high technology fields where the opportunity exists for CGEP to make a major impact upon Virginia's economic and social well-being. By adopting a proactive approach to new course topic introduction, CGEP can give faculty the time necessary to develop degree, certificate, and non-credit offerings that convey knowledge effectively in a distance learning environment. (CGEP anticipates that certificates will be issued by one of the five CGEP institutions, not CGEP itself.) As university faculty transition fundamental research into applied projects in emerging fields such as biotechnology and nanotechnology, there will also be increased industrial demand for knowledge in these areas. Companies will want to position themselves to take advantage of innovations in these fields, and CGEP must anticipate those desires through targeted course development.

Furthermore, CGEP must be certain that students are provided with access to the faculty talent and knowledge available within Virginia in each field. CGEP should review how course offerings are developed by the program in the different disciplines, possibly looking at the areas of excellence of the different schools within each discipline and encouraging schools to teach concentrations within those disciplines based upon local expertise. This will ensure that course duplication does not occur while also allowing CGEP to offer the best courseware products to its student market. For instance, in information technology, one CGEP member institution might be recognized as the state's premier educational program for distributed computing while a second member institution might have an exceptional faculty talent pool in real time database systems. Rather than preventing the first school from presenting information technology courses of any sort because the second school is CGEP's information technology course provider, CGEP should encourage both schools to develop courses, the first member in distributed computing and the second in real time database systems. CGEP should support these types of university efforts to service the various parts of each disciplinary market. Indeed, if multiple schools are teaching in a given discipline, then they could decide to divide delivery of the core courses, speeding student movement through the program.

Plan: During the 2002-2003 academic year, CGEP will organize a Course Transformation subcommittee led by the University of Virginia CGEP director and involving two other CGEP directors. This subcommittee will be tasked with engaging university faculty, university administrative staff, corporate customers, and distance learning students in a curricula review and development process that leads to a set of endorsed recommendations for new CGEP educational products. As part of this effort, CGEP will develop an industrial advisory board that helps to guide the program's course development plan.

Where possible, CGEP will link and motivate its course offerings by collaborating with other academic groups in the state that have an interest in educational materials development. Such groups include, but are not limited to, NASA's proposed National Institute of Aerospace (NIA), the Virginia Consortium of Engineering and Science Universities (VCES), the Virginia Center for Innovative Technology (CIT) funded Initiative for Nanotechnology in Virginia (INanoVA), the NSF Engineering Research Center at Virginia Tech – the Center for Power Electronic Systems (CPES), the NSF Materials Research Science and Engineering

Center at the University of Virginia – the Center for Nanoscopic Materials Design (CNMD), and the Commonwealth Technology Research Fund sponsored Center for High Performance Manufacturing located at Virginia Tech and James Madison University. Linkages to these existing, well-recognized programs will demonstrate CGEP's connection to cutting-edge high technology and help motivate faculty and university administrators to support CGEP's proposed curricula changes. In certain instances it could be possible for CGEP to join with one or more of these Virginia-based activities to pursue federal funding for development of new, innovative educational materials, above and beyond CGEP's existing portfolio. As an example, the National Science Foundation regularly has competitions in its Combined Research-Curriculum Development and its Research on Learning and Education programs.

While recognizing the importance of a thorough program development strategy, CGEP also acknowledges that, where possible, programmatic changes should be implemented now:

- To reach the objective of enhanced curricula diversity CGEP has already begun to offer certificate programs in Civil and Environmental Engineering. Four programs consisting of four credit courses each have been created. These offerings can be combined towards a degree if students decide to complete their course work.
- The 2001 CGEP Market Research Study revealed strong demand for course offerings in biomedical engineering. As a result, CGEP has now added biomedical course offerings to its portfolio.
- In the fall of 2002 CGEP will begin offering a certificate program in Industrial and Systems Engineering.
- Discussions have already been initiated with the universities' continuing education programs, investigating opportunities for adding professional development and softskill workshops and seminars to the CGEP product portfolio.
- To assist in identification of course offering targets of opportunity, CGEP has already identified a group of companies willing to become benchmark companies for the program. This set of companies has agreed to complete a yearly survey that will help CGEP keep abreast of changing market demands.

Metric: The Course Transformation subcommittee will deliver all of its recommendations to the engineering school deans of the consortium's five universities no later than January 1, 2003. The deans will be asked to review the recommendations, suggest modifications, and endorse a revised plan that CGEP can begin to implement no later than the fall of 2003. Following this comprehensive review process, CGEP will undertake a university, student, and corporate survey every year to monitor changes in the demand for educational products. This survey will not be nearly as extensive as the recent CGEP market survey. However it will be sufficient to provide a sense of market trends. Although the addition or deletion of CGEP courses has traditionally been left to the discretion of each university department, CGEP will evaluate whether or not a more centralized decision-making process is appropriate. While each department and university will rightly expect some institutional autonomy in these matters, it seems both appropriate and desirable to establish basic CGEP-wide protocols.

2. Product Development: Recognize the Development and Delivery of CGEP Curricula

Successful development of the CGEP curricula changes outlined in Goal 1 will depend strongly upon the enthusiastic participation of faculty at the five CGEP institutions. These highly-skilled individuals represent CGEP's workforce, and they, their departments, and schools must be properly motivated, compensated, and rewarded for the design and manufacture of CGEP's products – well-packaged distance learning educational materials. CGEP's ability to achieve this second goal is likely to define its overall level of success during the next five years. The program's ability to achieve Goal 2 will be challenged by its lack of authority to single-handedly reshape the incentive system that encourages university faculty, departments, and schools to participate in distance learning.

Faculty recognize that their professional development is judged through the promotion and tenure process. At each institution, this process involves peer-based assessment of an individual's research, teaching, and professional service activities. Excellence in teaching is one of the major criteria used to determine professional advancement in higher education, and the CGEP universities make strong efforts to ensure that their faculty receive sufficient credit for their distance learning efforts, whether those efforts involve development of full credit courses, non-credit offerings, or "Bits of Knowledge" module developments. Still, those involved in distance learning nationwide acknowledge than preparation of a course for the distance market requires extra investment by the faculty. If CGEP plans to urge faculty to participate more actively in distance learning education, especially as CGEP requests asynchronous or blended[4] course delivery, the program must be prepared to provide faculty with reasonable support (e.g., teacher friendly instructional facilities, faculty training workshops, instructional design, release time from other teaching, overload pay for teaching above the normal course loads, summer salary support, and access to teaching assistants and instructional staff development time).

Motivation of faculty to participate in CGEP is a key to program success, and the support of departments and schools is similarly critical. Consideration must be given to incentives that will motivate strong department and school participation in CGEP. The program must discover those factors that will motivate active participation on the part of the departments and schools capable of offering the educational materials desired by CGEP's knowledge-based, high technology corporate customers.

Proper motivation of CGEP's workforce to design and deliver its education courseware could have a major positive impact during the next five years of CGEP's development. Thus, CGEP proposes the following action plan.

Plan: During the 2002-2003 academic year, CGEP will organize a University Reward subcommittee led by the Virginia Tech CGEP Director and involving two other CGEP directors. This subcommittee will survey university faculty and administrative staff and develop an endorsed plan for recognition of the investments made by faculty, departments, and schools in the CGEP program. CGEP will review the different mechanisms currently in place throughout its system and work to implement the strongest set of incentives possible to ensure timely, high quality development of courses for the entire CGEP community. CGEP

[4] Blended learning mixes asynchronous and synchronous delivery of course content. While one class session could be delivered and received in real time, the next could be prepared and accessible on demand.

realizes that the incentive program will vary from university to university based upon the local professional environment and its existing structure.

Metric: The University Reward subcommittee will submit its proposed plan to the deans of the consortium's five content delivery universities no later than February 1, 2003. The deans will be asked to review the plan, suggest modifications, and endorse a revised plan that CGEP can begin to implement no later than the fall of 2003. By properly structuring a curricula development incentive plan, CGEP will fuel an educational engine that routinely produces the finest educational content possible for Virginia's industrial workforce, driving the Commonwealth forward toward economic prosperity. Ultimately, CGEP success on Goal 2 will be measured through the annual survey of university, student, and corporate stakeholders proposed under Goal 1.

3. Product Distribution: Enhance the Technology Infrastructure

As CGEP works to revise its education product offerings and recognize the efforts of its university-based workforce, the program should strive to make certain that the CGEP distance learning infrastructure facilitates the rapid development and dissemination of courseware, creating a more successful distance learning program. Specifically, CGEP should investigate new distance learning software and hardware offerings that can drive forward faculty investments effectively while simultaneously increasing student satisfaction with the educational products they receive. The program should also study how each CGEP university can best structure its internal resources to support faculty courseware development.

Since the program's inception, CGEP has worked to utilize effective media for the transmission of its courses. At present, the consortium employs two-way interactive video, the choice of 80% of the public four-year institutions around the country.[5] While continuing to maintain consistency with national trends, CGEP will strive during the next five years to enhance course delivery by utilizing its staff and hardware/software infrastructure more effectively for course development and transmission. While seeking to enhance CGEP, the program's leadership must always consider the impact of change upon its students, high technology corporate partners, and faculty courseware providers.

Since its inception in 1983, CGEP has changed course delivery hardware on several occasions. These changes have been motivated by the cost and course-delivery effectiveness of the different solutions available in the marketplace. While the infrastructure changes have always contributed to a higher quality of service, they have also led to the loss of some company-based receive sites. Certain companies simply could not justify investments in new distance learning technology every several years. CGEP must bear this lesson in mind as it moves forward with infrastructure development decisions in the next five years.

Using delivery of pedagogical quality as one of the most important metrics for decision-making, CGEP will investigate emerging distance learning hardware and software delivery solutions for their ability to foster effective course management and delivery in a distance learning environment. While CGEP recognizes that each member institution has made separate and often significantly different hardware and software choices to date, the program will seek to play an increasingly active role in future decisions on distance learning

[5] Distance Education at Postsecondary Education Institutions: 1997-98 Report, http://nces.ed.gov/pubs2000/2000013.pdf.

infrastructure at each institution. Over time, it is expected that, by playing an active role in technology selection decisions across the Commonwealth, CGEP can develop a more effective course delivery platform that benefits all of the program's stakeholders.

As CGEP studies and begins to provide input regarding distance learning decisions at its member institutions, the program must keep the interests of its students, high technology corporate partners, and faculty foremost in its institutional mind. Students must feel a sense of community, project involvement, access to faculty, and access to other individuals participating in each course offering. Partners within Virginia's knowledge-based, high technology companies must easily recognize that, when asked to invest in technology changes, their investments will lead to enhanced educational opportunities for their employees. Faculty should feel that their intellectual property is being utilized effectively in the distance learning environment, and they must perceive that the hardware and software changes advocated by CGEP are likely to make them more effective intellectual mentors.

Plan: CGEP will organize a Distribution Infrastructure subcommittee led by Old Dominion University's CGEP director and involving two other CGEP directors. Between 2002 and 2003, this subcommittee will develop a thorough understanding of the distance learning organizations at CGEP's five member institutions. The subcommittee will also launch an investigation of the state-of-the-art in distance learning hardware and software and begin to map out a long term strategic plan for preferred infrastructure development within CGEP. As the program formulates plans for its preferred distance learning technology solutions, this subcommittee will engage the distance learning organizations at each of the CGEP institutions in discussions that could influence technology development decisions at those schools.

Metric: The Distribution Infrastructure subcommittee will deliver the results of its survey of the distance learning organizations at each CGEP member institution to the CGEP directors by October 1, 2002. The subcommittee will then turn its attention to an initial survey of the distance learning hardware and software state-of-the-art. By March 1, 2003 the subcommittee will bring forward a strategic plan for influencing distance learning decisions at CGEP schools. The deans will be asked to review the recommendations, suggest modifications, and endorse a revised plan that CGEP can begin to advocate no later than the fall of 2003. Following this comprehensive hardware and software review process, CGEP will undertake a technology review every other year to monitor changes in the distance learning hardware/software delivery options. While the challenge involved in achieving real change at the five institutions is significant, it is appropriate for CGEP to evaluate and advocate adoption of common hardware and software solutions across CGEP.

4. Product Distribution: Develop Just-in-Time Delivery Opportunities

Within today's fast-paced corporate world, it is often difficult for employees to consistently carve out set times each week to pursue their advanced education goals. As a result, the demand for asynchronous and blended learning is on the rise, and CGEP must evaluate how best to meet this market need while maintaining course quality. CGEP already supports a variety of course-delivery formats beyond videoconferencing. These secondary methods of course delivery include CD-ROM, VHS, streaming video, and the web. Except for a few instances in which faculty are experimenting with asynchronous course content delivery, all of these other delivery methods are currently considered secondary course delivery methods

simply designed to provide students with the ability to catch-up on missed class sessions. Asynchronous or blended course delivery is currently the exception rather than the rule within CGEP.

While the 2001 CGEP Market Research Study reveals an increasing demand for asynchronous learning via alternate delivery methods like the internet, the CGEP surveys also affirm that students want to be part of a learning community. CGEP must balance the market demand for just-in-time access to course content with the recognized benefits of learning in an educational community. Through careful design of course materials and use of well-researched course delivery software as described under Goal 3 above, CGEP could create an effective learning environment drawing upon the best of synchronous and asynchronous educational material delivery.

The shift to asynchronous or blended distance learning must be made carefully. Shifting course delivery too quickly or extensively could damage the quality of faculty delivery and thus consumer satisfaction. Educators acknowledge that course materials must be developed differently if they are to be delivered asynchronously. To ensure that faculty are able to create the most professional educational product possible, CGEP must consider how to orient its resources to support design of educational content for effective asynchronous delivery. CGEP may need to consider the provision of instructional-staff support to help faculty understand the opportunities and pitfalls of asynchronous course delivery.

Efforts to encourage faculty development of course content that can be delivered asynchronously could have important benefits for CGEP. Specifically, asynchronous or blended course delivery could allow the program to significantly increase the number of courses offered each semester, addressing one of the key points of the market research survey. Today, CGEP has a fixed number of course content origination and receive sites. In any given location, e.g. Abingdon, there could be just two classrooms available to receive CGEP courses. Today, if classes are taught twice per week, this might mean that Abingdon can only accommodate students for ten or twelve separate courses each week, assuming that only synchronous courses are delivered during the prime hours of 6 – 10 pm. However, if one of the two class sessions for each course can be offered asynchronously rather than synchronously, CGEP can double its available classroom space in Abingdon and elsewhere, without investing in additional classrooms. As long as students are provided the means by which they can access asynchronous course content outside their normal CGEP classroom, this use of synchronous and asynchronous course delivery can provide opportunities for CGEP growth.

Plan: During 2002 and 2003, CGEP's Distribution Infrastructure subcommittee led by Old Dominion University's CGEP Director will examine the hardware/software, course delivery, and course content issues associated with CGEP's expected move from synchronous delivery of course materials to a mixture of synchronous and asynchronous delivery. This investigation of just-in-time course content delivery will couple well with the subcommittee's efforts to identify a more effective hardware and software profile for CGEP course offerings. Where possible, CGEP should rely upon recently completed distance learning technology studies to provide guidance regarding development of asynchronous and blended course content.

Metric: The Distribution Infrastructure subcommittee will deliver all of its recommendations to the CGEP directors and the deans of the consortium's five universities no later than August 1, 2003. The deans will be asked to review the recommendations, suggest modifications, and endorse a revised plan that CGEP can begin to implement no later than the fall of 2004. Following this comprehensive process, CGEP will review its policies on asynchronous and blended course delivery every two years.

5. Product Sale: Expand Product Advertising

As CGEP focuses upon educational product development through Goals 1 and 2 and upon educational product distribution through Goals 3 and 4, it will also work during the next five years to increase enrollments in its educational offerings through enhanced program visibility and more pervasive consumer opportunities to acquire its offerings. These integrated marketing efforts should lead to stabilization and growth of student enrollment in CGEP courses. In his April 2000 report on CGEP, Ernest Smerdon noted that, "the reason for such a large drop in enrollment [in recent years] to a significant extent is due to factors that are largely beyond the control of those managing CGEP." While this is true, the 2001 CGEP Market Research Study also revealed that 64% of potential students surveyed said that they were "not at all familiar" with CGEP. Clearly students must know about the program before they can consider signing up to take one or more of its educational offerings.

To enhance program visibility, the 2001 CGEP Market Research Study proposed that CGEP should establish a different brand name for its post baccalaureate program and that it should develop a multifaceted communication strategy. To address these issues, CGEP has just brought on-line a centralized internet web site through which its customers can obtain information (http://cgep.schev.edu). The existence of this website will begin to provide the program with a centralized, uniform interface to its customers. This web site is an important step that will further CGEP's recognized position as one unified statewide program built upon the academic base of five outstanding Virginia universities.

While a centralized web site has tremendous value for CGEP, it is really only one small component of what needs to be an integrated CGEP marketing plan. CGEP must implement a visible strategy of marketing, public relations, sales promotion, and advertising. Once companies and students are aware that CGEP exists, they can access the web site to learn more about the program. However, unless companies and students know of the program, they are not likely to encounter the content that resides on CGEP's web site. Thus, CGEP needs to develop additional primary methods of customer contact, including e-mail, printed brochures, personal contacts, and notices distributed throughout Virginia's knowledge-based high technology companies. The market research study indicates that the preferred way to receive information about course opportunities is from colleagues.

While there are many possibilities for CGEP advertising, the program must recognize that it has limited personnel and financial resources for marketing. Thus, it must choose its preferred mechanisms carefully. Development of desirable course offerings as described in Points 1 and 2 above are an important part of effective marketing – having a product to offer. Still, CGEP must sell itself more effectively, and, to begin that process, it is now suggested that CGEP begin to market course offerings under the unified title of *The Virginia Leading EDGES Program*. This program

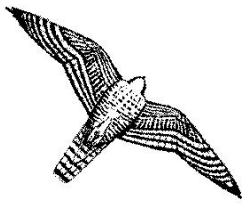

Figure 1. *The Virginia Leading EDGES Program* logo will be based upon a bird motif similar to this image of the very fast Peregrine Falcon found in the

title and an associated logo will enhance market recognition of CGEP's mission to offer Education at a Distance in Graduate Engineering and Science (EDGES). Using this new courseware title, CGEP should develop press releases and favorable new articles that highlight the program. This new name should also be prominently displayed at CGEP open house events.

In addition to more effective advertising and branding of CGEP course content, CGEP should explore opportunities to leverage the efforts of other state or federally sponsored education programs in Virginia into an even larger, unified statewide initiative for high technology distance learning. Through collegial cooperation, CGEP and other education initiatives such as NASA's proposed National Institute of Aerospace (NIA), the Virginia Consortium of Engineering and Science Universities (VCES), the Virginia Center for Innovative Technology (CIT) funded Initiative for Nanotechnology in Virginia (INanoVA), the NSF Engineering Research Center at Virginia Tech – the Center for Power Electronic Systems (CPES), the NSF Materials Research Science and Engineering Center at the University of Virginia – the Center for Nanoscopic Materials Design (CNMD), and the Commonwealth Technology Research Fund sponsored Center for High Performance Manufacturing located at Virginia Tech and James Madison University could effectively and collaboratively serve the various segments of the engineering and science education market in Virginia. Efforts will be made to enhance collaboration when possible for the effective delivery of education to the Commonwealth.

Plan: CGEP will establish an Integrated Marketing subcommittee under the direction of George Mason University's CGEP director and involving two other directors. During the summer of 2002, this subcommittee will develop an explicit advertising campaign that identifies targets of advertising opportunity. By September 1, 2002 the subcommittee will submit to the CGEP directors and the CGEP deans a plan for a new integrated marketing campaign, appropriate for the CGEP funding budget. The plan will include recommended public relations, advertising, and sales promotion activities, personnel to undertake the efforts, and specific activities and events in which CGEP will participate to enhance program visibility. Following endorsement by the deans, CGEP will initiate action on the recommendations to the extent possible within current funding budgets.

In addition to a new integrated marketing campaign, the Integrated Marketing Subcommittee will open dialogue with other groups within the Commonwealth of Virginia interested in graduate level engineering and science education. To establish this dialogue, the subcommittee must engage in a dialogue that identifies the mutually beneficial opportunities for advanced engineering and science education initiatives. Following a set of meetings with relevant programs, the Integrated Marketing Subcommittee will deliver a report outlining a proposed set of joint educational initiatives in partnership with one or more of the organizations identified previously. This report will be submitted to SCHEV by January 2003. Action on the proposed plan will begin immediately upon SCHEV endorsement of the recommendations.

Metric: The numerous opportunities for enhanced program visibility allow several metrics to be established to measure CGEP success in this arena. First, CGEP has just brought its new, unified web site on-line. Then as noted above, the Integrated Marketing Subcommittee will deliver a report in September 2002 on advertising strategies and a report in January 2003 on strategic partnerships within the Commonwealth. CGEP will then undertake a new

advertising campaign and strategic partnership program. To gauge the effectiveness of the advertising campaign, CGEP will generate a market survey in 2003 in which it will assess the effectiveness of its new marketing efforts. By 2003, CGEP would like to see a stabilization of its course enrollment, and subsequently in 2004 and later years it should work to produce annual increases in student enrollment of 10% or more. As Smerdon noted in his report, "For this program of continuing post-graduate education for employed engineers, the productivity measures should be the number of engineers served and the number of courses taught, not the number of degrees produced."

6. Product Sale: Create More Outlets

As CGEP succeeds in creating a more varied, timely, and well-publicized set of educational offerings, product demand should increase. Ease of access to the program should then be enhanced through the installation of more outlets for CGEP product distribution. Working closely with individual Virginia-based companies, CGEP will seek to establish course material delivery platforms inside the doors of corporate Virginia. This on-site delivery of course content to students will lower the barrier to student sign-up for *The Virginia Leading EDGES Program* and begin to harness the economy of scale that comes from course delivery to large numbers of students. It will also begin to move CGEP from academic center to personal desktop delivery of content, in line with customer desires.

While there will be company costs associated with installation of on-site facilities for continuing education, some companies may find that there existing videoconference facilities are already sufficient to support CGEP course offerings. In other cases, CGEP should work closely with companies to identify the most sensible solution for educational material delivery. Companies appear to be committed to investments in internet based training. The 2001 CGEP Market Research Study suggests that in the year 2000, corporations spent $2.2 billion on internet based training and that by 2003 this market is expected to increase to $11 billion. In contrast to the large dollars being invested to support on-line education, the cost of establishing a CGEP receive site appears quite low, ranging from $1500 for single desktop computers that serve individual students up to $25,000 for a room equipped to deliver course audio and video to a group of students, and the per hour cost for delivery continues to decrease. CGEP should work closely with Virginia based companies and federal government customers to ensure that these customers understand the cost-benefit analysis of CGEP higher education for employees.

It should be noted that the majority of companies surveyed by CGEP in 2001 (60%) reported having no staff to facilitate distance education, and only 37% of respondents indicated that they have in-house staff to facilitate distance education. CGEP will need to be cognizant of this limitation as it seeks to develop company-based receive sites. However, there could be an opportunity here for company-based support of CGEP staff to assist in development and maintenance of company-based facilities.

Plan: A new CGEP Customer Recruitment subcommittee under the direction of Virginia Commonwealth University's CGEP director, and involving two other directors, will develop a plan for the creation of additional CGEP receive sites throughout the Commonwealth. Efforts by this subcommittee will be closely coupled with the efforts of the Integrated Marketing subcommittee and the Course Transformation subcommittee. Working with the CGEP industrial advisory board, the Customer Recruitment subcommittee will identify a list of 10 high priority companies by September 2002 that CGEP will actively seek to recruit into

its customer base. Through on-site visits and discussions, CGEP will work to identify which of these companies are most likely to invest in the development of a CGEP receive site. Then, working in close cooperation with the most likely partners, CGEP will guide the creation of new outlets for its course offerings.

Metric: CGEP will seek to realize growth in its number of receive sites. It is proposed that CGEP set a goal for annual receive site growth of 5% in 2003, 10% in 2004 and 15% in 2005, 2006, and 2007. This will equate to an increase in the number of receive sites from 20 to 36 during this five year strategic plan, and it is anticipated that there will be a strong, corresponding increase in CGEP off-campus enrollment.

CONCLUDING THOUGHTS

"States through their public universities have an obligation to provide programs that will help working engineer citizens to achieve their professional education goals. CGEP is a program that can and should fill this need (Ernest Smerdon, April 2000)." Through this strategic plan, CGEP lays out its five year vision for continued service to the graduate engineering and science community of Virginia knowledge-based, high technology companies. The CGEP program has developed significantly since its inception in 1983. It has served many Virginia-based engineers and scientists and has contributed to the economic and social well-being of the Commonwealth of Virginia. Now is the time for CGEP stakeholders to come together to move CGEP actively into the twenty-first century where it can develop and serve new generations of scientists and engineers who are dedicated to building Virginia's new high technology future. Smerdon notes that, "CGEP has a solid framework upon which to build the programs needed for early years of this new century. It would be a mistake to cease or downsize the operation. To do so would send the wrong signals to Virginia's working engineers, the corporate leaders, and the committed faculty of the CGEP universities." Instead, CGEP and SCHEV should commit themselves to the plans and goals outlined in this strategic plan. SCHEV support for the vision expressed in this strategic plan will be critical to successful implementation. The CGEP workforce and customers need to understand that the activities of CGEP are endorsed by the state and that Commonwealth investments in the program are designed to develop the best possible distance learning program for the knowledge workers of Virginia. Through successful implementation of this vision, CGEP can make a nationally recognized impact upon Virginia's ability to compete in the world-economy of the twenty-first century.

ACKNOWLEDGEMENTS

Stephen Nash
George Mason University CGEP Director

Jack Gwinn
Director, Center for Advanced Engineering, Lynchburg

Bernie Gering
CGEP Site Coordinator, Mary Washington College

John Hagy
Director, NSWC-Dalhgren Center

Berndt Bohm
Old Dominion University CGEP Director

Tim Owen
Director, South Boston Center

James Groves
University of Virginia CGEP Director

John Payne III
Cp-Ed Technologies
University of Virginia

Gerald Miller
Virginia Commonwealth University CGEP Director

Glenda Scales
Virginia Tech CGEP Director
CGEP State Director